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January 23, 1997

Via FedEx (202-418-0300)

William F. Caton
Acting Secretary
Federal Communications Commission
1919 M. Street, N.W.
Washington, D.C. 20554

Re: MM Docket No. 87-268

Dear Mr. Caton:

Please find enclosed an original and nine copies of reply comments in the above captioned proceeding.

Very truly yours,

Louis Robert du Treil

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BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, DC 20554

In the Matter of Advanced Television Systems and Their Impact upon the Existing Television Broadcast Service	))))	MM Docket No. 87-268

Reply Comments of of du Treil, Lundin & Rackley, Inc. in Sixth Further Notice of Proposed Rule Making

These reply comments are submitted on behalf of the consulting engineering firm of du Treil, Lundin and Rackley, Inc. (dLR). This firm and its predecessors have been practicing consulting communications engineering before the Federal Communications Commission (FCC) for more than 50 years. The firm submitted comments concerning the FCC's *Sixth Further Notice of Proposed Rule Making* (*FNPRM*) in MM Docket No. 87-268. The proceeding concerns advanced television systems and their impact upon existing service. In the *FNPRM* the FCC proposed an allotment table for digital television (DTV) assignments, including proposed levels of effective radiated power (ERP) to replicate existing coverage. The *FNPRM* also proposed to reclaim part of the current TV spectrum and make it available for other communications services.

From the vast number of comments filed, it is obvious there is considerable interest in the proceeding. The purpose of dLR's reply comments is to address issues raised in the comments filed by other parties, and to modify and clarify the DTV allotment method suggested by dLR in its previous comments.

As expected and understandable, most comments seem somewhat self-serving. The TV broadcasters want all TV channels available through the DTV transition period. The low power television (LPTV) proponents do not want to be displaced and request protection from DTV allotments as if the LPTV were a full service station. The land mobile radio service (LMRS) proponents do not think that the FCC went far enough in protecting is current operations and making additional TV spectrum available to other services. Public radio does not want its non-commercial, educational FM stations to have to contend with any channel 6 DTV assignments. From a review of the comments, all of these parties have valid concerns. It is apparent the FCC cannot satisfy everyone. Even a large entity such as the Broadcaster's Caucus (BC) encounters differences among its members. In this big and complex project, everyone must give a little to accomplish the greater good.

Planning Factors

A key element for a DTV allotment plan is the planning factors. This can not be over stressed. The FCC's proposed DTV allotment table was based on planning factors which it identified in the *FNPRM*. Comments filed in the proceeding indicate there are differences in opinion regarding the FCC's proposed planning factors, including comments from the BC and the Association of Federal Communications Consulting Engineers (AFCCE). In addition, several comments indicate a great deal of skepticism over the ability of actually operating adjacent channel NTSC and DTV assignments in what the FCC considers a co-located situation. There are concerns over the potential co-channel and adjacent channel impact of DTV on LMRS operations. Public radio is concerned about interference from channel 6 DTV stations to the adjacent frequencies in which NCE-FM operates. Unfortunately, there has not been sufficient field-testing to satisfy these valid concerns.

In order for an optimum allotment plan to be developed for the transition to DTV, it is imperative for the FCC to be able to finalize the planning factors and interference ratios based on the best information available. It is imperative that the industry (broadcasters, manufacturers, etc.) and government agencies provide whatever information is available to the FCC. Ideally, the information should be based on actual field test data. Alternatively, information based on laboratory test data and research can be provided. However, if the basis can not be made on actual field test data, the FCC must be conservative. As more information becomes available through actual field test measurements, the FCC can make adjustments to the planning factors and interference ratios. By the time TV stations are ready for the final transition to DTV, a more optimum plan can be developed by the FCC, which may permit the recapture of additional spectrum.

DTV Allocation Plan

In its comments, dLR suggested that all stations operate on a temporary loaner channel for the DTV transition period. Stations would return to their current NTSC channel for the final DTV operation and replication of the current NTSC Grade B coverage area. In order to reduce interference and impact to services currently using the spectrum (TV, LPTV, LMRS, NCE-FM), as well as, to reduce equipment and power demands, dLR suggested that stations replicate the NTSC Grade A contour with the DTV operation during the transition period. The firm still holds this position, with modification, and provides additional support after reviewing the comments filed. Unfortunately is not able to provide a revised DTV allotment table based on its suggestions as it lacks the necessary computer program. The firm is only able to provide suggestions that we hope the FCC is able to implement in a revised plan.

This firm originally suggested replication of each station's Grade A contour for the transition to DTV operation. The power for the transitional DTV channel would be based on replication of the NTSC Grade A contour with the DTV noise limited f(50,90) contour. However, the NTSC Grade A signal level is based on an acceptable quality service to 70% of the locations for 90% of the time. It is now dLR's opinion that the power for the transitional DTV channel should be based on replication of the NTSC Grade A contour with the DTV noise limited f(70,90) contour.

The noise limited contours proposed in the *FNPRM* are 26.8 dBu for low VHF channels, 31.8 dBu for high VHF channels, and 43.8 dBu for UHF channels.

Average NTSC transmitting facilities for TV stations in the various bands is given below. For an example, UHF DTV power levels to replicate Grade A coverage for the transitional period based on dLR's original comments [f(50,90)] and as now suggested [f(70,90)] are given.

TABLE I – COMPARISON OF UHF POWER LEVELS TO REPLICATE GRADE A COVERAGE

NTSC Band	Average NTSC		UHF DTV ERP F(50,90) (kW)	UHF DTV ERP F(70,90) (kW)
	ERP (kW)	HAAT (m)		
Low VHF	87	433	2.5	10.6
High VHF	266	433	13.7	57.0
UHF	2510	361	7.2	30.2

Similar low power levels are realized for replication of NTSC Grade A coverage with VHF DTV operations during the transitional period.

By replicating the existing NTSC Grade A contour with the DTV f(70,90) noise limited contour, the DTV noise limited f(50,90) contour will extend to a location between the NTSC Grade A and Grade B contour. This represents greater DTV transitional coverage than originally suggested by dLR in its comments. The following table shows the average NTSC transmitting facilities for each band, the distance to the predicted NTSC Grade A contour, the suggested DTV transitional power in the UHF band, and the distances to the UHF DTV f(70,90) and f(50,90) 43.8 dBu noise limited contours.

TABLE II – COMPARISON OF DISTANCES TO CONTOURS FOR PROPOSED DTV ERP LEVELS

NTSC Band	Average NTSC		Predicted NTSC Grade A (km)	DTV ERP (kW)	Predicted 43.8 dBu f(70,90) (km)	Predicted 43.8 dBu f(50,90) (km)
	ERP (kW)	HAAT (m)				
Low VHF	87	433	61.3	10.6	61.3	70.2
High VHF	266	433	71.8	57.0	71.8	81.1
UHF	2510	361	63.7	30.2	63.7	72.3

As shown, the UHF f(50,90) noise limited contour will extend at least 13% further than as originally suggest by dLR.

The dLR comments included a showing that 99% of the US population receives a predicted Grade B signal from a licensed NTSC station. Approximately 95% of the US population receive a predicted Grade A signal. The same percentage (95%) will receive a DTV f(70,90) noise limited

contour during the transition if the Grade A contour is replicated. As demonstrated above, using the DTV f(70,90) noise limited contour to replicate the NTSC Grade A contour will extend the DTV f(50,90) noise limited contour (approximately 13% increase). Recalculation of the coverage indicates approximately 241,356,291 people within the US would be within the revised f(50,90) noise limited contour for the DTV transitional operations. This represents 97% of the total US population.

The lower DTV power level required to replicate an NTSC station's Grade A contour for the transition period provides the industry and FCC with a "cushion" to learn, adjust and work out potential bugs in the DTV system, while minimizing interference to existing service. It can be definitively determined whether adjacent channel DTV is compatible with NTSC, LMRS, NCE-FM, and at what power levels and interference ratios. This transitional/learning period will enable the FCC to optimize DTV replication of existing Grade B coverage for the final DTV transition. The FCC can consider higher DTV power during the transition on a case-to-case basis after experience and input from a reasonable period of operation throughout the country, and assuming there will be no adverse interference impact on other service. Experience during the transitional period will also enable the FCC to finalize the maximum permitted DTV powers for each band (low VHF, high VHF & UHF).

As pointed out in dLR's comments, as well as many other comments filed in the proceeding, the powers proposed by the FCC and BC for NTSC VHF stations going to DTV UHF channels, is unrealistically high in many cases. It is not practical to replicate superior VHF propagation with brute force UHF power. Furthermore, large disparities occur in the DTV power levels for stations in the same band and market. The following is an example from the FCC's proposed DTV allotment table for the Washington, DC market.

TABLE III – COMPARISON OF ERP LEVELS PROPOSED FOR WASHINGTON, DC MARKET

Station	NTSC Channel	DTV Channel	DTV ERP (kW-average)
WRC-TV	4	36	5000
WTTG	5	30	5000
WJLA-TV	7	33	3011
WUSA	9	59	3011
WTMW	14	15	132.5
WDCA	20	69	255
WETA-TV	26	35	112
WHMM	32	6	1.0
WBDC-TV	50	51	134.1
WNVC	56	48	50
WVVI	66	34	229.8

You will note the proposed DTV ERP levels to replicate the service of the 4 NTSC-VHF stations going to DTV-UHF channels are all in excess of 3000 kW. By comparison, the DTV ERP levels for the NTSC-UHF stations remaining on UHF DTV channels are all less than 10% of the level proposed for the 4 VHF stations. There will be more than a 10-to-1-power difference between DTV stations in the same band in the same market. This same scenario occurs in other markets where NTSC-VHF stations are going to DTV-UHF channels.

With all VHF stations returning to their current NTSC channels for the final DTV operation, this in-band power disparity is avoided. The VHF stations will continue to realize their VHF propagation advantages without the huge UHF power requirement. The FCC will be able to control and maintain reasonable in-band power levels. Potential receiver overload problems from the large power levels are avoided. Similarly, serious radio frequency (RF) radiation concerns from the large DTV average power levels are avoided.

Furthermore, with stations returning to their current NTSC channels for the final DTV operation, every station will continue to be able to maximize their operations, as they have been able to do under the NTSC system. For instance, an NTSC-UHF station is currently permitted maximum transmitting facilities consisting of a peak visual ERP of 5000 kW and an antenna height above average terrain (HAAT) of 610 meters (2000 feet). The station's DTV operation on the same channel should be permitted maximum DTV facilities of an ERP of 408 kW and an antenna HAAT of 610 meters to replicate the NTSC Grade B contour.

Retention of Existing TV Spectrum

For the VHF stations to return to their NTSC channels for the final DTV operation requires retention of the VHF channels for continued TV service. As pointed out by LMRS proponents, the VHF band is the most spectrum efficient of the TV bands, with approximately 58 stations per channel, while the UHF band has considerably less TV stations per channel. The dLR comments, along with comments from other parties, refuted the FCC's belief that low VHF channels are not suitable for DTV use. The Charlotte field tests demonstrated that DTV is better than NTSC at low VHF and UHF. In other words DTV is better than NTSC regardless of the TV band. Furthermore, this firm's review of the comments filed in the proceeding did not note an outcry from other services requesting use of the low VHF frequencies. Conversely, the demand from other services for access to the UHF TV spectrum was staggering.

It is dLR's belief that the VHF TV band (2-13) must be retained for TV use, and that adjustments should be made in the UHF TV spectrum to accommodate the FCC's desire for additional spectrum for other services. Channels 14 through 59 of the UHF band should also be retained for TV use. Based on this firm's review of the documents in the proceeding, recapture of channels 60 to 69 (60 MHz) appears to be the obvious choice for other services. This position is not reached without a great deal of pain. Existing TV users in this band will be required relocate. It was not too many years ago that 84 MHz of the UHF TV spectrum was recaptured for other use (channels 70 through 83). LPTV stations were required to vacate the spectrum and the FCC encouraged them to find a new location between channels 55 and 69. It does not seem equitable to now require them to move again.

LPTV

In its comments, Trinity Broadcasting indicates that the FCC's proposed DTV allotment table would impact 98 of their 200 LPTV stations. Trinity indicates these 98 LPTV stations cover a population in excess of 26,000,000 people. The BC comments indicate that its proposal appears to impact about half the number of LPTV stations as the FCC proposal. For Trinity, this would still probably be a staggering blow. Based on FCC action in other proceedings, it is hard to believe that the FCC would find a proposal that adversely impacts this many people to be in the "public's interest". The plan for TV's transition from NTSC to DTV must consider LPTV operations.

In order for the FCC to recapture channels 60-69 in a reasonable time frame, it is suggested that no transitional DTV channels be provided in that portion of the band. Potential channels for existing 60-69 NTSC users to relocate their NTSC operations should be examined (such as relocation to a vacant channel below channel 60, or a possible least short-spaced drop-in allotment). After the transitional DTV allotment table is published, existing LPTV users in the 60-69 band should be encouraged to find new channels. The FCC can permit early access to those portions of the 60-69 band where no interference will be caused to existing TV users. If a new service wishes access to a portion of the 60-69 band before an existing TV/LPTV user is required to vacate, then the FCC might require the new user to pay for the TV/LPTV early relocation.

The FCC is encouraged to consider liberal waivers of the allocation standards for displaced LPTV stations during the DTV transition period. This does not mean a complete disregard for interference. However, requiring a strict no-interference policy from "all" services during this spectrum taxing transitional period is unreasonable. It is obviously in the public interest to minimize disruptions to all existing services (TV, LPTV, LMRS, NCE-FM, etc.). As noted at the beginning of these comments, everyone must give a little for the transition to work.

Once the transition to DTV is complete, all TV use of channels 60-69 should have been completed. With the additional benefit of operating experience the FCC can then examine the possibility of re-packing the UHF DTV band to recapture additional UHF spectrum for other services. New users of the additional recaptured band should pay for the relocation of existing TV/LPTV services in that band. It should be noted that much of the desire for UHF spectrum continues to come from LMRS/public safety proponents. These proponents are reminded that there are other sources for their communications needs (cellular, PCS, SMR, wireless, etc.). The FCC is encouraged to fully evaluate the needs and other available sources before it reduces the TV spectrum again.

Land Mobile

Ideally, the existing LMRS users of UHF TV channels 14-20 in certain large markets would be relocated up into the channel 60-69 band. This would assist in relocation of TV and LPTV stations currently in the channel 60-69 band. However, the cost for this approach is probably prohibitive in most of the markets where LMRS uses channels 14-20. Regardless, each of the markets should be examined individually to determine if LMRS relocation is economically feasible

and TV use is otherwise possible. Where LMRS use of the channel is relatively light, or not currently possible due to border agreements, those channels should be retained for TV use. The cost of relocating an existing user is generally borne by the new user. However, it is recognized that LPTV stations have not benefited from this policy.

International Agreements

It is believed that coordination with Canada and Mexico will be much easier under dLR's suggested method. Each station will return to its current NTSC channel, which has already met coordination requirements. Furthermore, the DTV power levels on the current NTSC channels will be less than currently permitted. It is anticipated that the temporary transitional DTV operations on other channels can be treated similar to LPTV, STA or experimental operations with respect to Canada and Mexico. The temporary transitional DTV facilities should not cause interference to existing Canadian and Mexican service in their respective countries.

Ineligible Stations

Currently ineligible TV stations are more likely to find a possible DTV transitional channel with the dLR suggested method. However if a DTV transitional channel is not possible for the currently ineligible station, then it can decide whether to continue broadcasting NTSC on the current channel, or make the conversion to DTV on its current channel. Similarly, if DTV transitional channels are not possible for new NTSC stations that the FCC may authorize, the new station can decide whether to commence broadcasting NTSC and then convert, or to commence DTV right away. The FCC may wish to encourage new stations to commence operation with DTV to enhance a faster industry transition to DTV. In addition, by all stations returning to their NTSC channels for the final DTV operation (except for those in the 60-69 band), recovery of vacant TV allotments (NCE and commercial) is possible.

In determining the temporary DTV transition channels for existing TV stations, dLR encourages the FCC to consider the following items in weighing potential channels.

1. Avoid channels 3 & 4 in the same market because of the VCR issue.

2. Avoid DTV allotments on channels 60-69. New users of channel 60 must accept possible interference from TV use of channel 59.

3. By replicating Grade A coverage for the transition, co-channel and adjacent channel interference concerns for LMRS use of channels should be less. However, until the effect of DTV on LMRS operations is known through actual field tests, the FCC should maintain conservative separations.

4. Avoid assigning DTV channel 6 to an area with low channel NCE FM operations (perhaps, 201-210). The lower DTV power suggested for replication of the Grade A coverage will help alleviate this concern until the mutual effect of DTV and NCE-FM can be field tested.

5. Protect the service of existing Canadian and Mexican stations within their respective borders.

6. Because of the skepticism raised over the actual ability to operate "co-located" adjacent channel NTSC and DTV stations at this time without degradation of the signal, the FCC is encouraged to minimize DTV transitional channels adjacent to an NTSC channel. The lower power suggested for replication of a station's Grade A service should help in this quest until actual field testing can substantiate the ability to operate co-located adjacent channel NTSC and DTV.

7. It is recommended that the FCC examine the DTV transitional channel to determine if it will displace an operating LPTV station. If it will, can an alternative DTV channel be proposed with no or less impact on existing services? A listing should be kept of those LPTV stations that will be displaced (including those in 60-69). After the transitional DTV allotments are made, it is suggested that the list of displaced LPTV stations be examined to see if replacement channels are possible. As noted above, the FCC is encouraged to take a more liberal approach to its strict LPTV "no interference" standards for displaced stations during the DTV transition period.

Conclusion

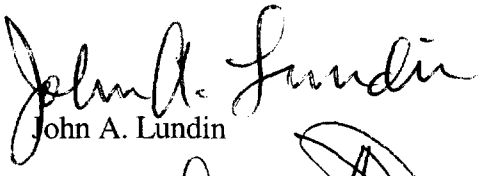
The dLR suggested method for transition to DTV would be less burdensome on existing TV stations. The relatively low powered transitional DTV facilities will be less costly, a major factor for all stations, but especially non-commercial, educational television stations. It will have less loading effect on existing supporting structures. The TV station's current equipment can be used for the final DTV operation with modification to the transmitter system. The lower powered transitional DTV facilities will cause less interference and have less impact on existing LPTV services.

There does not appear to be a painless way to accomplish the transition to DTV and to recover spectrum in a timely fashion for other use. dLR believes it has suggested a means of accomplishing the transition to DTV with minimum impact to existing users. The firm has also recommended a means for the FCC to quickly recover 60 MHz of UHF spectrum for other services. After the transition to DTV has been accomplished, the FCC can study the possibility of making

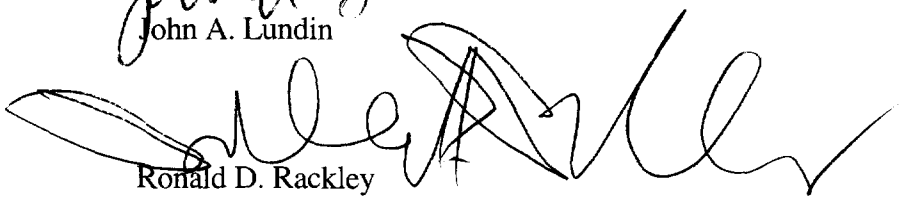
additional spectrum available if there is justifiable demand and no other means of accomplishing the communication needs.

Respectfully submitted,

Louis R. du Treil



John A. Lundin



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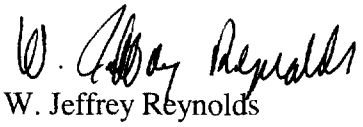

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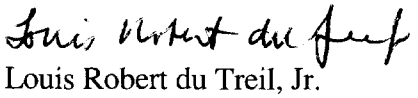

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